Concussion Information and Protocol

A concussion is a type of traumatic brain injury that interferes with normal function of the brain. All concussions are brain injuries.

A concussion can be caused by blow to the head or even a blow to the body alone. The force moves or twists the brain in the skull. It is important to know that loss of consciousness is not required to have a concussion. In fact, less than 10% of athletes lose consciousness. A concussion is a very complex physiologic event that causes a problem with brain function not brain structure. Therefore, CT/CAT scan and MRI are usually normal in athletes with concussion. Imaging studies may be needed to rule out brain bleeds but are not indicated in all head concussions.

Even what appears to be a mild blow to the head or body can cause the brain to suddenly shift or move. This motion can injure and damage brain cells. Research has shown that this damage may take up to 2 weeks to heal, but it can take longer.

Concussion affects people in four areas of function:

1. Physical – This describes how they feel: headache, nausea, vomiting, dizziness, tired and loss of consciousness (which is uncommon in concussion).
2. Thinking – Poor memory and concentration, responds to questions more slowly and asks repetitive questions. Concussion can cause an altered state of awareness and thinking.
3. Emotions- A concussion can make a person more irritable or sad and cause mood swings.
4. Sleep – Concussions frequently cause trouble falling asleep and may wake athletes up overnight, which can make them more fatigued throughout the day.

Based on recent high school injury surveillance information, boys & girls ice hockey are on the list of which sports have the highest risk of concussion based on athletic exposures (practice + competition). Noticeable in this data is that the risk for girls is much higher than boys in the same sports Most importantly, a concussion can happen to anyone in any sport. Concussions also occur away from organized sports in physical education class, on the playground, while skiing or snowboarding, and when involved in a motor vehicle collision.

Everyone involved with athletic activities must be alert for potential injuries during play and be able to recognize signs and symptoms of concussion. While coaches are not expected to make a diagnosis of concussion, it is expected for coaches to be aware that their athletes may have a concussion and then hold them out of all activity until they are medically cleared by a healthcare provider. Signs are what can be seen by others, like clumsiness, while symptoms are what the injured player feels, like a headache. Remember, athletes should report their symptoms, but they may not unless they are asked and even then, it is important to consider that athletes may not be telling the truth. Thus, it is important for all hockey organizations to educate their athletes, coaching staff and parents in the preseason about the seriousness of concussion and the importance of athletes honestly reporting their symptoms and injuries.

These are some **SIGNS** concussion (what others can see in an injured athlete):

- Dazed or stunned appearance
- Change in the level of consciousness or awareness
- Confused about assignment
- Forgets plays
- Unsure of score, game, opponent
- Clumsy
- Answers more slowly than usual
- Shows behavior changes
- Loss of consciousness
- Asks repetitive questions or memory concerns

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These are some of the more common **SYMPTOMS** of concussion (what an injured athlete feels):

- Headache
- Nausea
- Dizzy or unsteady
- Sensitive to light or noise
- Feeling mentally foggy
- Problems with concentration and memory
- Confused
- Slow

Injured athletes can exhibit many or just a few of the signs and/or symptoms of concussion. However, if a player exhibits any signs or symptoms of concussion, the responsibility is simple: remove them from participation. "**When in doubt sit them out.**"

It is important to notify a parent or guardian when an athlete is thought to have a concussion. Any athlete with a concussion must be seen by an appropriate health care provider before returning to any practice (including off-ice activities) or competition.

If you suspect a player may have a concussion, that athlete shall be immediately removed from play. The injured athlete shall be kept out of play until they are cleared to return by an appropriate health care provider. If the athlete has a concussion, that athlete shall never be allowed to return to activity (conditioning, practice or competition) that day. Athletes with a concussion shall never be allowed to return to activity while they still have symptoms.

A player with a concussion must be carefully observed throughout the practice or competition to be sure they are not feeling worse. Even though the athlete is not participating, never send a concussed athlete to the locker room alone and never allow the injured athlete to drive home.

Most concussions are temporary, and they resolve without causing residual problems. However, in the adolescent population, 10-20% of athletes that have a concussion have signs or symptoms that persist beyond 2 weeks. These symptoms of headache, difficulty concentrating, poor memory and sleep disturbances can lead to academic troubles among other problems. Concussion symptoms may even last weeks to months (post-concussion syndrome).

Allowing an injured athlete to return too quickly increases the risk for repeat concussion. Repeat concussion may cause Second Impact Syndrome. Second Impact Syndrome is a rare phenomenon which happens only in young athletes that causes rapid brain swelling and death. Repeat concussions may increase the chance of long-term problems, such as decreased brain function, persistent symptoms and potentially chronic traumatic encephalopathy (a disorder that cause early degeneration of the brain similar to what is seen with Alzheimer's disease).

A major concern with concussion in the youth athletes is that it can interfere with school performance. The signs and symptoms of poor short-term memory, concentration and organization may temporarily turn a good student into a poor student. The best way to address this is to decrease the academic workload by potentially taking time off from school or going partial days. Injured athletes should have extra time to complete homework and tests, and they should be given written instructions for homework. New information should be presented slowly and repeated. Injured athletes will need time to catch up and may benefit from tutoring. If an athlete develops worsening symptoms at school, he/she should be allowed to visit the school nurse. The school should maintain regular contact with the injured athlete's parents to update progress. Athletes with a concussion should return to full speed academics without accommodations before returning to sports.

Rest is the essential component of concussion treatment. Further contact is to be avoided at all costs due to risk of repeat concussion and Second Impact Syndrome. Physical exertion can also worsen symptoms and prolong concussion recovery- this includes aerobic conditioning and resistance training. Physical activity should not be started without authorization by an appropriate health care provider.

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It is also important to remember that the athlete's concussion can interfere with work and social events (movies, dances, attending games, etc.). It is important for injured athletes to sleep as often as possible. It is also helpful for parents to decrease brain stimulation at home by limiting video games, computer time, text messaging, and TV/movies.

Neuropsychological testing has become more commonplace in concussion evaluation as a means to provide an objective measure of brain function. It is best used as a tool to help ensure safe return to activity and not as the only piece of the decision-making process. Testing is currently done using computerized neuropsychological testing (example: ImPACT, Axon Sports) or through a more detailed pen and paper test administered by a neuropsychologist.

If neuropsychological testing is available, ideally a baseline or pre-injury test is obtained prior to the season. This baseline should be done in a quiet environment when the athlete is well rested. It is felt that baseline testing should be repeated every two years for the developing adolescent brain. If there is no baseline available, the injured athlete's scores can be compared to age established norms. Missouri Hockey feels that neuropsychological testing can be a very useful tool with regard to concussion management, but it is not mandatory.

RETURN TO PLAY

Current recommendations are for a stepwise return to play program. In order to resume activity, the athlete must be symptom free and off any pain control or headache medications. The athlete should be carrying a full academic load without any significant accommodations. Finally, the athlete must have clearance from an appropriate health care provider.

The program described below is a guideline for returning concussed athletes when they are symptom free. Athletes with multiple concussions and athletes with prolonged symptoms often require a very different return to activity program and should be managed by a physician that has experience in treating concussion.

The following program allows for one step per 24 hours. The program allows for a gradual increase in heart rate/physical exertion, coordination, and then allows contact. If symptoms return, the athlete should stop activity and notify their healthcare provider before progressing to the next level.

STEP ONE: About 15 minutes of light exercise: stationary biking or jogging

STEP TWO: More strenuous running and sprinting in the gym or field without equipment

STEP THREE: Begin non-contact drills in full uniform. May also resume weight lifting

STEP FOUR: Full practice with contact

STEP FIVE: Full game clearance

PREVENTION

There is nothing that truly prevents concussion. Education and recognition of concussion are the keys in reducing the risk of problems with concussion. Proper equipment fit and use may reduce the risk of concussion. However, helmets do NOT prevent concussion. They are used to prevent facial injuries and skull fractures. Most importantly, proper technique for hitting/contact are vital, for example, athletes that lower their head while making a football tackle have a significantly higher risk for concussion and neck injuries. Athletes should never lead with their head or helmet. Missouri Hockey encourages every member Club/Association to promote concussion education and bring about a positive change in concussion culture by discussing this topic with all teachers, coaches, athletes and parents. Further reading and additional education material can be obtained through the following locations:

www.nfhs.com
www.nfhslearn.com (free concussion education video)
www.cdc.gov/concussion/headsup/high_school.html (Heads Up program)
www.wisportsconcussion.org (Wisconsin Sports Concussion Collaborative)

American Academy of Pediatrics: Epidemiology of Post-Concussion Syndrome in Pediatric Mild Traumatic Brain Injury